CLAIMS:

1. A capacitor fabrication method comprising:

forming a first capacitor electrode over a substrate;

atomic layer depositing a conductive barrier layer to oxygen diffusion over the first electrode;

forming a capacitor dielectric layer over the first electrode; and

forming a second capacitor electrode over the dielectric layer.

2. The method of claim 1 wherein the atomic layer depositing occurs at a temperature of from about 100 to about 600 °C and at a pressure of from about 0.1 to about 10 Torr.

3. The method of claim 1 wherein the atomic layer deposited barrier layer has a thickness of from about 50 to about 500 Angstroms.

4. The method of claim 1 wherein the atomic layer deposited barrier layer contacts one of the first or second electrodes.

5. The method of claim 1 wherein the atomic layer deposited barrier layer comprises WN, WSiN, TaN, TiN, TiSiN, Pt, Pt alloys, Ir, Ir alloys, Pd, Pd alloys, RuO_x, or IrO_x.

6. The method of claim 1 wherein the dielectric layer exhibits a K factor of greater than about 7 at 20 °C.

7. The method of claim 1 wherein at least one of the first or second electrodes comprise polysilicon and the dielectric layer comprises oxygen.

8. The method of claim 1 wherein the dielectric layer comprises Ta_2O_5, ZrO_2, WO_3, Al_2O_3, HfO_2, barium strontium titanate, or strontium titanate.

9. The method of claim 1 wherein the dielectric layer is over the barrier layer.

10. The method of claim 9 further comprising atomic layer depositing another conductive barrier layer to oxygen diffusion over the dielectric layer.

11. The method of claim 1 wherein the forming the electrodes and the dielectric layer occur by other than atomic layer deposition.

12. The method of claim 1 further comprising cleaning the first electrode prior to the atomic layer depositing by a method comprising HF dip, HF vapor clean, or NF_3 remote plasma.

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13. A capacitor fabrication method comprising:

A capacitor comprising

forming a first capacitor electrode over a substrate;

chemisorbing a layer of a first precursor at least one monolayer thick over the first electrode;

chemisorbing a layer of a second precursor at least one monolayer thick on the first precursor layer, a chemisorption product of the first and second precursor layers being comprised by a layer of a conductive barrier material;

forming a capacitor dielectric layer over the first electrode; and

forming a second capacitor electrode over the dielectric layer.

14. The method of claim 13 wherein the first and second precursor layers each consist essentially of a monolayer.

15. The method of claim 13 wherein the first and second precursor layers each comprise substantially saturated monolayers.

16. The method of claim 13 wherein the first and second precursor each consist essentially of only one chemical species.

17. The method of claim 13 wherein the first precursor is different from the second precursor.

18. The method of claim 13 wherein the first and second precursors respectively comprise only one of the following pairs: WF_6/NH_3, $TaCl_5/NH_3$, $TiCl_4/NH_3$, tetrakis(dimethylamido)titanium/NH_3, ruthenium cyclopentadiene/H_2O, IrF_5/H_2O, organometallic Pt/H_2O.

19. The method of claim 13 wherein the dielectric layer is over the barrier layer, further comprising chemisorbing additional alternating first and second precursor layers before forming the dielectric layer.

20. The method of claim 19 wherein the barrier layer has a thickness and a density effective to reduce oxidation of the first electrode by oxygen from over the barrier layer.

21. The method of claim 19 wherein the barrier layer has a thickness of from about 50 to about 500 Angstroms.

22. The method of claim 13 wherein the barrier layer comprises WN, WSiN, TaN, TiN, TiSiN, Pt, Pt alloys, Ir, Ir alloys, Pd, Pd alloys, RuO_x, or IrO_x.

23. The method of claim 13 wherein the dielectric layer exhibits a K factor of greater than about 7 at 20 °C.

24. The method of claim 13 wherein at least one of the first or second electrodes comprises polysilicon and the dielectric layer comprises oxygen.

25. The method of claim 13 wherein the dielectric layer comprises Ta_2O_5, ZrO_2, WO_3, Al_2O_3, HfO_2, barium strontium titanate, or strontium titanate.

26. A capacitor construction comprising a first capacitor electrode over a substrate, a capacitor dielectric layer over the first electrode, a second capacitor electrode over the dielectric layer, and an atomic layer deposited conductive barrier layer to oxygen diffusion between the first and second electrodes.

27. The construction of claim 26 wherein the dielectric layer is over the barrier layer.

28. The construction of claim 27 further comprising another conductive barrier layer to oxygen diffusion over the dielectric layer.

29. The construction of claim 26 wherein the barrier layer comprises WN, WSiN, TaN, TiN, TiSiN, Pt, Pt alloys, Ir, Ir alloys, Pd, Pd alloys, RuO_x, or IrO_x.

30. The construction of claim 26 wherein the dielectric layer exhibits a K factor of greater than about 7 at 20 °C.

31. A capacitor construction comprising:

a first capacitor electrode over a substrate;

a conductive barrier layer to oxygen diffusion over the first electrode, the barrier layer comprising a chemisorption product of first and second precursor layers;

a capacitor dielectric layer over the first electrode; and

a second capacitor electrode over the dielectric layer.

32. The construction of claim 31 wherein the barrier layer comprises WN, WSiN, TaN, TiN, TiSiN, Pt, Pt alloys, Ir, Ir alloys, Pd, Pd alloys, RuO_x, or IrO_x.

33. The construction of claim 31 wherein the dielectric layer exhibits a K factor of greater than about 7 at 20 °C.